Space Weather Forecast

Issued on Monday, 11 September 2023 at 01:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Moderate flares likely (R1-R2 radio blackouts). Chance of G1 Minor storms Day 2 (12 Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low, with only common class flares observed, the largest from the large sunspot just northwest of centre disc. There has been an increase in the number of observed spots on the disc with thirteen now visible, although three of these will rotate away over the northwest limb during the next 24 hours. The large sunspot remains is currently the main flare source. This is comprised of a number of mature spots, including a large trailer and seen ongoing slow development, although the overall areal extent appears to have now stabilised. Despite a number of spots emerging in the southern disc, they are predominately small and simple, however there is one of particular interest in the southeast. This is currently a small, still developing region, and consists a compact bipolar cluster with some evidence potential instability due to some shear on its magnetic field.

No Earth-directed CMEs (coronal mass ejections) have been observed in available coronagraph imagery, with a bright CME off the northwest assessed as far-sided.

Solar Wind / Geomagnetic Activity: Background solar winds were observed, around 350km/s. The Interplanetary Magnetic Field (IMF) was weak throughout with the north-south component only weakly varying, and mainly positive (northward) at first. Geomagnetic activity was Quiet (Kp 0 to 2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain mostly Low but with an ongoing chance of isolated Moderate flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. The solar wind forecast is low confidence. This is due to a coronal hole that appears to be in a good location to give a significant enhancement, but was similarly located on the last rotation yet no enhancement was observed. Despite this, the fast winds associated with the coronal hole are considered most likely to arrive at Earth day 2 (12 Sep). A further, but weaker coronal hole enhancement, is then expected either late on day 3 or day 4 (13-14 Sep). This one would be in agreement with observed conditions on the last 27-day rotation. Overall, the current forecast is a solar wind enhancement day 2, with current Quiet geomagnetic activity becoming Unsettled to Active and bringing a chance of G1 Minor Storms. This will likely ease to Quiet to Unsettled day 3 (13 Sep), with a subsequent enhancement late day 3 or day 4 (13-14 Sep), bringing a chance of Active intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to persist at background with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	30	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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